AFNeT – prostep ivip STEP AP242 Day

27 November 2019

Hamburg, ZAL

Presentation by CoreTechnologie
Who are we?

CAD interoperability software solutions

- More than 18 years of experience
- Worldwide 600+ software customers
- 30+ OEM software partners
- Headquarter in Germany
- Research & Development centers in France and Morocco
- Sales offices and resellers in China, France, Germany, India, Ireland, Italy, Japan, Korea, Russia and USA
- 75 employees
Who are we?

1 TECHNOLOGY – 4 PRODUCTS

1. Proprietary geometric modeler specifically dedicated to data conversion
2. Direct CAD interfaces for reading and saving standard's formats as well as native file without using CAD license*
3. Check and validation tools
4. Healing technology
5. Simplification tools
6. 3D parametric model with construction history conversion

* some native writing interfaces uses plugin that needs license of the targeted CAD software

3D_Evolution
- All conversion types (natives-standard, BREP-Tesselated-History, part-structure)
- Batch mode for automatic or huge data processing
- All our advanced tools (check, validation, comparison, healing, simplification...)

3D_Analyzer
- Viewing and analysis software (new UI, easy to handle)
- All our readers
- All our analysis tools
- Exports into light formats

3D_Kernel_IO
- Software library for OEM customers
- All readers, all direct writers
- Healing technology

4D_Additive
- CAD data preparation for 3D Printing
- All readers, export in 3D Print formats
- Placement, support, nesting, slicing & textures
Who are we?

**AUTOMOTIVE**
- Audi
- Chrysler
- MAGNA
- Daimler
- Continental
- Tata
- Ford
- Fiat
- Honda
- Valeo
- MAN
- Renault

**AERONAUTIC**
- AIRBUS GROUP
- Thales
- Barnes Aerospace
- ATK
- Lufthansa Technik
- BREEZE-EASTERN CORPORATION
- Gulfstream
- Safran
- Mitsubishi Aircraft Corporation

**INDUSTRY / ENERGY**
- Siemens
- CAT
- Rexroth Bosch Group
- BASF
- ABB
- Grob
- Kuka
- STX
- SBII Offshore
- Komatsu
- Liebherr
- Areva

**SOFTWARE EDITORS**
- Altair
- MSC Software
- Epic Games
- Zeiss
- Pointwise
- AutoForm
- Optis
- SPRING
- Beta CAE Systems SA

27.11.2019, Gauthier Wahu - CoreTechnologie
Our vision about standards

**STANDARD**
- Everybody can use the format
- Format is published
- No obsolescence – durability
- Mostly independent of software version
- Do not use original data structure - > need conversion
- Not easy – sometimes impossible to store everything ( proprietary concepts)
- Often ascii format (less compact)

**NATIVE**
- Need specific software
- Format is proprietary
- Format frequently change
- Compatibility with software version
- Close to the software data structure -> no conversion
- Contain ALL information designed including specific concepts
- Often binary formats (more compact)
How do we implement and share with others?

- Standard formats are important for us as they are used in approx. 30% of our customer processes.

- It is essential to join professional organizations like implementor forums in order to promote usage of standard.

- Our strategy is to be pro-active in the implementor forums for the most important standard formats. This allows us to be always up to date and improve the reliability of our interfaces.

- All our products share the same implementation of the standard and are frequently updated in order to support as much as possible the latest version of the standard.

www.ap242.org
Our key differentiators

- 100% of the core technology is home made : geometric kernel, STEP parsers, validation tools, metadata management …
  - Benefit : We can adapt quickly and without restriction our software

- We can read native data from nearly all the major CAD software on the market
  - Benefit : We have a deep understanding of most of these CAD software’s specificities.

- Thanks to our long customer experience we already have data structure and knowledge in many advanced applications
  - Example 1 : Composite were first implemented for our customer Altair Engineering
  - Example 2 : Our knowledge in Wire Harness design is coming from a project we did for LMCO

- We are really involved in the Implementor Forums and in realization of Pilots
  - Benefit : We work since early stage of the definition of the standard. This give us more time to understand what’s needs to be done and allow us to be ready instantly when a new standard’s edition is released.
<table>
<thead>
<tr>
<th>#</th>
<th>Weeks on Chart</th>
<th>Last Week’s Position</th>
<th>Model Base Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>30</td>
<td><strong>No Paper Anymore. (We Want Full 3D Tolerancing)</strong></td>
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<tr>
<td>2</td>
<td>2</td>
<td>21</td>
<td><strong>PDM Data Exchange</strong></td>
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<td>3</td>
<td>3</td>
<td>36</td>
<td><strong>Long Term Archiving</strong></td>
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<tr>
<td>4</td>
<td>3</td>
<td>26</td>
<td><strong>3D Engineering Data Conversion &amp; Exchange</strong></td>
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<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td><strong>3D Engineering Data Visualization</strong></td>
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<td>6</td>
<td>6</td>
<td>15</td>
<td><strong>Kinematic Exchange</strong></td>
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<td>7</td>
<td>7</td>
<td>10</td>
<td><strong>Wire Harness Data Exchange &amp; Archiving</strong></td>
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<tr>
<td>8</td>
<td>8</td>
<td>9</td>
<td><strong>Composite Data Exchange &amp; Archiving</strong></td>
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<tr>
<td>9</td>
<td>9</td>
<td>1</td>
<td><strong>Simulation Data Exchange &amp; Archiving</strong></td>
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<tr>
<td>10</td>
<td>10</td>
<td>1</td>
<td><strong>Manufacturing Data Exchange &amp; Archiving</strong></td>
</tr>
</tbody>
</table>

**Model Base Engineering**

- **No Paper Anymore. (We Want Full 3D Tolerancing)**

**PDM Data Exchange**

- **One Format For All My PDM Data. (Everybody Wants AP242)**

**Long Term Archiving**

- **Save Me And Retrieve Me With Confidence In Many Many Years. (Using My Validation Properties)**

**3D Engineering Data Conversion & Exchange**

- **Please, Send Me A File I Can Read. (With Any Of My Software)**

**3D Engineering Data Visualization**

- **I Want To Show You My Design Data. (But Not Giving You Everything)**

**Kinematic Exchange**

- **Let’s Animate My Products. (Transferring Animations And Joints)**

**Wire Harness Data Exchange & Archiving**

- **Electricity. (A Description More Complete And More Detailed Than Just The Geometry For My Harnesses)**

**Composite Data Exchange & Archiving**

- **Ply & Rosette. (Everything Needed To Describe A Composite Part)**

**Simulation Data Exchange & Archiving**

- **AP 209. (Universal Format For Simulation Preparation & Results)**

**Manufacturing Data Exchange & Archiving**

- **Machining & 3D Printing. (Universal Format For Manufacturing Preparation & Instructions)**
## Coverage Matrix

<table>
<thead>
<tr>
<th></th>
<th>CAD information</th>
<th>AP242 edition</th>
<th>Implementation Format</th>
<th>Level of implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D geometry</td>
<td>3D exact BREP representation</td>
<td>ed1</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>3D tessellated BREP representation</td>
<td>ed1</td>
<td>x</td>
<td>x</td>
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<tr>
<td></td>
<td>3D tessellated curved triangle representation</td>
<td>ed2</td>
<td></td>
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<tr>
<td></td>
<td>3D scan</td>
<td>ed2</td>
<td></td>
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<tr>
<td></td>
<td>presentation (color, layers, transparency, invisibility, etc)</td>
<td>ed1</td>
<td>x</td>
<td>x</td>
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<tr>
<td></td>
<td>3D texture</td>
<td>ed2</td>
<td></td>
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<tr>
<td>3D PMI (Product &amp; Manuf. Information) (GD&amp;T, 3D annotations, 3D symbols, UDA)</td>
<td>graphic presentation</td>
<td>ed1</td>
<td>x</td>
<td>x</td>
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<tr>
<td></td>
<td>semantic representation</td>
<td>ed1</td>
<td>x</td>
<td>x</td>
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<tr>
<td>3D machining form feature</td>
<td>Milling, Turning, Drilling, etc</td>
<td>ed1</td>
<td></td>
<td></td>
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<tr>
<td>Validation</td>
<td>Validation Properties</td>
<td>ed1</td>
<td>x</td>
<td>x</td>
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<tr>
<td></td>
<td>Equivalence validation (shape)</td>
<td>ed2</td>
<td></td>
<td></td>
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<tr>
<td>assembly structure</td>
<td>1 STEP file with assembly structure and 3D geometry</td>
<td>ed1</td>
<td>x</td>
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<td></td>
<td>1 assembly with references to CAD 3D files</td>
<td>ed1</td>
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<td>x</td>
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<td>nested assemblies with references to CAD 3D files</td>
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<td></td>
<td>Mechanism</td>
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<td>Composite design</td>
<td>ply definition based on exact surface</td>
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<td>Electrical Wiring Harness</td>
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<td>wire list</td>
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<tr>
<td>Additive Manufacturing</td>
<td>build orientation, part placement, support, etc</td>
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<td>STEP compressed file</td>
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</table>
## Coverage Matrix

<table>
<thead>
<tr>
<th>PDM and other meta data information</th>
<th>AP242 edition</th>
<th>Implementation Format</th>
<th>Level of implementation</th>
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<tr>
<td></td>
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<td>P21- AIM</td>
<td>XML BO M.</td>
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<tr>
<td>&quot;As Design&quot; product structure</td>
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<tr>
<td>&quot;As Planned&quot; product structure</td>
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<td>x</td>
<td>x</td>
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<tr>
<td>&quot;As Built&quot; product structure (including &quot;individual product&quot;)</td>
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<td>x</td>
<td>x</td>
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<tr>
<td>Traceability links between product views</td>
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<tr>
<td>Document structure</td>
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<td>Classification</td>
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<td>Customized PDM properties</td>
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<td>Configuration management - based on effectivities</td>
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<td>Configuration management - based on specifications</td>
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<td>Delta change management</td>
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<td>Interface management</td>
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<td>Mating definition</td>
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<td>Requirement management (text based, property based)</td>
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<tr>
<td>Process planning</td>
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<tr>
<td>Validation and verification</td>
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<tr>
<td>Message</td>
<td>ed2</td>
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Thank you!